

## WHAT IS CLAIMED IS:

5 1. A method of generating an image of an object using a multimode imaging system configured to operate in at least one of a plurality of modes of operation, the multimode imaging system including a source assembly, a detector assembly, and a means for positioning the source assembly and the detector assembly, the source assembly coupled to the means for positioning and including an x-ray source configured to emit x-ray signals, the detector assembly coupled to the means for positioning and including a detector, said method comprising the steps of:

selecting at least one mode of operation;

10 positioning the source assembly and the detector assembly for each determined mode of operation;

generating an image of the object for each determined mode of operation.

15 2. A method in accordance with Claim 1 wherein selecting at least one mode of operation, said method comprises the step of selecting at least one of a computed tomography mode, an x-ray mode, a fluoroscopy mode, a tomosynthesis mode, and a volume computed tomography mode.

3. A method in accordance with Claim 1 wherein positioning the source assembly and the detector assembly, said method comprises the step of rotating the detector assembly and the source assembly about the object.

20 4. An imaging system for generating an image of an object, said imaging system configured to operate in at least one of a plurality of modes of operation and comprising:

25 a source assembly comprising a movable x-ray source configured to emit x-ray signals;

a detector assembly comprising a movable detector;

a positioning means for positioning said source assembly and said detector assembly relative to the object, said source assembly movably coupled to said positioning means and said detector assembly movably coupled to said positioning means; and

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*concluded*

a controller enabling an operator to selectively operate said system in at least one of a plurality of modes.

*in said*

5. A method in accordance with Claim 4 wherein said plurality of modes comprises at least one of a computed tomography mode, an x-ray mode, a fluoroscopy mode, a tomosynthesis mode, and a volume computed tomography mode.

6. An imaging system in accordance with Claim 4 wherein said source is configured to move relative to said positioning means to alter a distance from said source to said detector.

10 7. An imaging system in accordance with Claim 4 wherein said detector is configured to move relative to said positioning means to alter a distance from said detector to said source.

15 8. An imaging system in accordance with Claim 4 wherein said source and said detector are aligned along a plane of interest, and wherein at least one of said source and said detector configured to move relative to other said assembly and said positioning means to alter said plane of interest.

9. An imaging system in accordance with Claim 4 further comprising a table for supporting the object, said source and said detector are movable relative to said table.

20 10. An imaging system in accordance with Claim 9 wherein said positioning means is movable relative to said table.

11. An imaging system in accordance with Claim 4 wherein said detector comprises at least one detector panel.

12. An imaging system in accordance with Claim 11 wherein at least one said detector panel is rotatable relative to said positioning means.

25 13. An imaging system in accordance with Claim 11 wherein said detector comprises a first detector panel and a second detector panel.

14. An imaging system in accordance with Claim 13 wherein said first detector panel is angularly positioned relative to said second detector panel.

15. An imaging system in accordance with Claim 4 wherein said positioning means comprises a base and an arm movably coupled to said base.

5 16. An imaging system in accordance with Claim 15 wherein said arm comprises a first end portion and a second end portion wherein said x-ray source assembly coupled to said arm first end portion, and wherein said detector assembly coupled to said arm second end portion.

17. An imaging system in accordance with Claim 4 wherein said positioning means comprises a base and a gantry rotatably coupled to said base.

5 18. An imaging system for generating an image of an object, said imaging system comprising a base, a positioning means movably coupled to said base, an x-ray source assembly comprising an x-ray source configured to emit x-ray signals and coupled to said positioning means, and a detector assembly comprising a detector coupled to said positioning means, said system configured to:

enable an operator to select a mode of operation;

alter the position of said detector assembly and said source assembly relative to said other assembly and the object based on the selected mode; and

generate an image of the object.

10 19. A system in accordance with Claim 18 wherein to enable the operator to select a mode, said system is configured enable the operator to select at least one of a computed tomography mode, an x-ray mode, a fluoroscopy mode, a tomosynthesis mode, and a volume computed tomography mode.

15 20. A system in accordance with Claim 18 wherein to alter the position of said detector assembly and said source assembly, said system is configured to rotate said positioning means relative to said base so that said detector assembly and said source assembly are rotated about the object.

20 21. A system in accordance with Claim 18 wherein to alter the position of said detector assembly and said source assembly, said system is configured to move at least one of said source and said detector relative to said other assembly to alter a distance between said source and said detector.

25 22. A system in accordance with Claim 18 wherein said source and said detector are aligned along a plane of interest, and wherein to alter the position of said detector assembly and said source assembly, said system is configured to move at least one of said source and said detector relative to said other assembly to alter the plane of interest.

30 23. A system in accordance with Claim 22 wherein to move at least one of said source and said detector relative to said other assembly, said system is configured to translate at least one of said source and said detector parallel to the plane of interest.

24. A system in accordance with Claim 18 further comprising a table for supporting the object, and wherein to alter the position of said detector assembly and said source assembly, said system is configured to move said detector and said source relative to said table.

5           25. A system in accordance with Claim 24 wherein to move said detector assembly and said source assembly relative to said table, said system is configured to rotate said detector assembly and said source assembly about said table.

10           26. A system in accordance with Claim 18 wherein to generate an image of the object, said system is configured to radiate x-ray signals from said x-ray source toward said detector.

15           27. A system in accordance with Claim 26 wherein to generate an image of the object, said system is further configured to collect image data.

20           28. A system in accordance with Claim 27 wherein said detector assembly comprises at least one detector panel, and wherein to collect image data, said system is configured to detect x-ray signals utilizing a portion of at least one of said detector panel.

25           29. A system in accordance with Claim 28 wherein to detect x-ray signals utilizing a portion of at least one of said detector panel, said system is configured to alter a position of at least one of said detector panel.

30           30. A system in accordance with Claim 26 wherein said detector assembly comprises a first detector panel and a second detector panel, and wherein to collect image data, said system is configured to angularly position said first detector panel relative to said second detector panel.

35           31. A system in accordance with Claim 30 wherein to angularly position said first detector panel relative to said second detector panel, said system is configured to position said first detector panel at an obtuse angle relative to said second detector panel.

40           32. A system in accordance with Claim 30 wherein to angularly position said first detector panel relative to said second detector panel, said system is configured to position said first detector panel at an acute angle relative to said second detector panel.

33. A system in accordance with Claim 30 wherein to angularly position said first detector panel relative to said second detector panel, said system is configured to position said first detector panel perpendicular to said second detector panel.

5 34. A system in accordance with Claim 18 wherein said positioning means comprises an arm having a first end portion and a second end portion, wherein said x-ray source assembly coupled to said arm first end portion, and wherein said detector assembly coupled to said arm second end portion.

10 35. A system in accordance with Claim 18 wherein said positioning means comprises a gantry rotatably coupled to said base.

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